古脊椎动物与古人类
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內蒙古阿拉善旗肉食龙类化石*

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肉食龙类(Carnosauria)在我国的內蒙古自治区、新疆維吾尔自治区、甘肃、黑龙江、辽宁、山东、山西、江西、四川和云南等省均有发现。地史分布从晚三迭世至白堊紀。至目前为止,我国已发现七个属:云南晚三迭世的中国龙(*Sinosaurus*)、四川晚侏罗世的四川龙(*Szechuanosaurus*)、剑閣龙(*Chienkosaurus*),山东晚白堊世的金刚口龙(*Chinkankousaurus*),內蒙古早白堊世的 ?*Prodinodon*、晚白堊世的 *Alectrosaurus*, 黑龙江晚白堊世的 *Albertosaurus*。除中国龙属和 *Alectrosaurus* 属的材料比較好而且較丰富外,其余的几个属多为单个牙齿和零星的骨骼所代表。

1960 年,中苏古生物工作者在內蒙古巴彥淖尔盟,阿拉善旗吉兰泰盐湖北約 60 公里的毛尔图鄂博和大水沟两地共同进行工作,发現了一批肉食龙类化石,这一批材料为我国至目前为止已发现的肉食龙类中,材料多且保存完好的一批。与这些肉食龙类化石一起发现的有巨大的甲龙类和蜥脚类化石,个体完整的鳥脚类化石,还有龟鼈类化石;除此之外,还有軟体动物和植物化石。毛尔图和大水沟是我国富产脊椎动物化石的产地之一。

本文仅就上述两地点的肉食龙类化石加以記述。

笔者衷心感謝楊鍾健教授、刘宪亭先生的指导和帮助,同时对孙艾玲、叶祥奎二同志的热心帮助也致以謝意。

标 本 記 述

蜥臀目 Saurischia
兽脚亚目 Theropoda
肉食龙次亚目 Carnosauria
巨齿龙科 Megalosauridae
吉兰泰龙 *Chilantaisaurus* 新属

特征: 肱骨长而粗壮,三角稜嵴很发育,骨长几为股骨长的一半。第 I 指的爪特别強大,側扁且強烈地弯曲。脛骨比股骨短。蹠骨短,近端不相連接,蹠骨 III 不退化。

大水沟吉兰泰龙 *Chilantaisaurus tashuikouensis* 新种

特征: 与属的特征同。

材料: 一右肱骨,第 I 指的爪,破碎的左腸骨,左右股骨各一,左右脛骨各一,右腓骨,

* 1963 年 11 月 26 日收到。

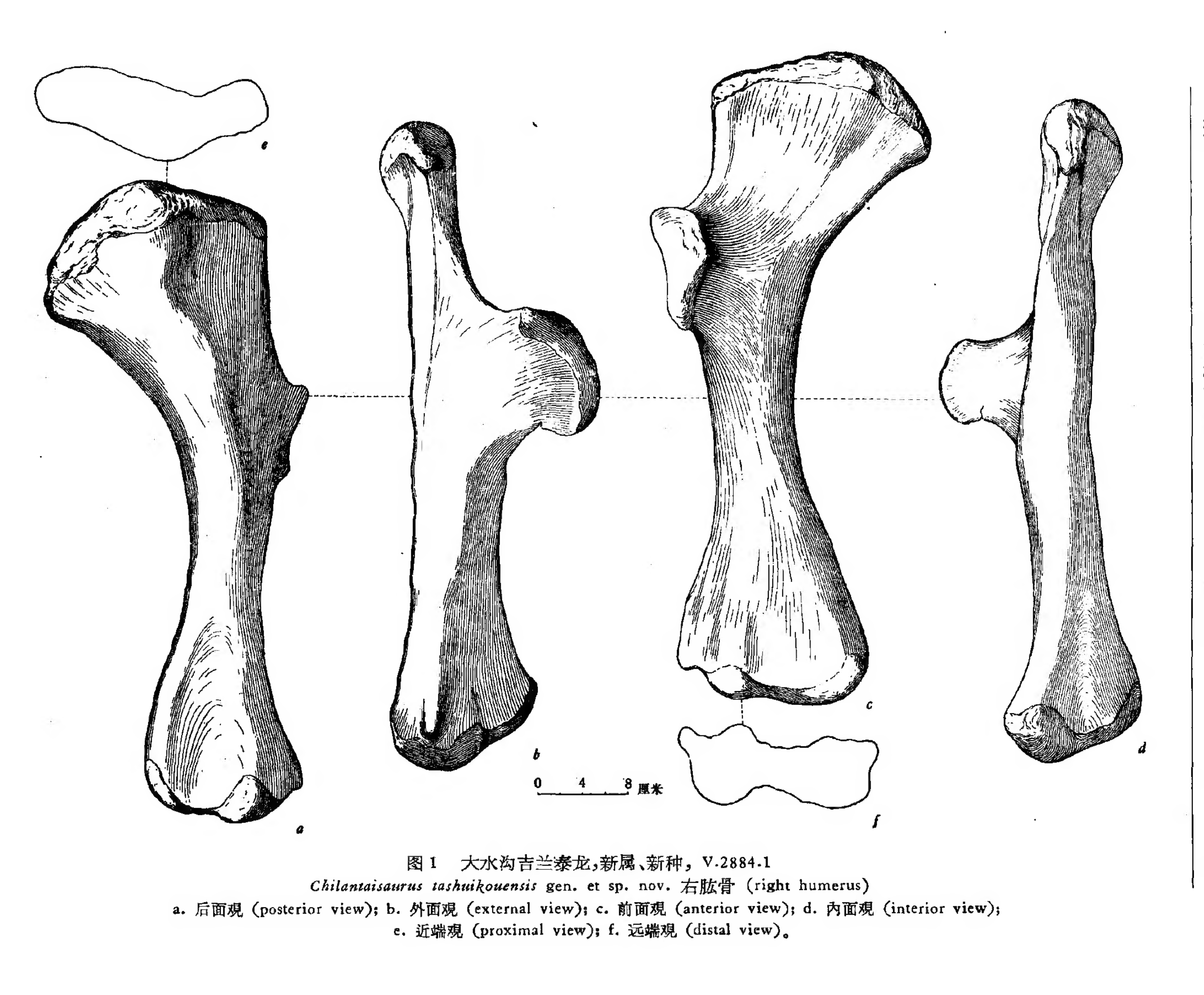


图 1　大水沟吉兰泰龙，新属、新种，V.2884.1

Chilantaisaurus tashuikouensis gen. et sp. nov. 右肱骨 (right humerus)

a. 后面观 (posterior view); b. 外面观 (external view); c. 前面观 (anterior view); d. 內面观 (interior view); e. 近端观 (proximal view); f. 远端观 (distal view)。

右蹠骨 II—IV 和左蹠骨 III 和 IV。所有的材料属于同一个体。标本登記号 V.2884。

产地和时代：內蒙古巴彥淖尔盟，阿拉善旗吉兰泰盐湖北 60 公里毛尔图鄂博东北 15 公里大水沟。晚白垩世。

描述：

右肱骨 V.2884.1（图 1）：骨长而粗壮，其长度較所有已知的肉食龙类的都大，几乎为股骨长的一半，肱骨和股骨长度之比为 0.487。肱骨略呈 S 形。近端和远端之間的骨干微有扭轉。近端扩展而扁平。三角稜嵴（deltiod crest）非常发育，为一短而高并稍弯曲的骨板，位于骨干的前外側緣，从頂端向下約 150 毫米处，从該处突然聳起，此稜嵴的下端在骨干之中部。从前面观，骨干的上段凹入。三角稜嵴以下部分粗壮且較圓。远端扩展且扁平，橈骨髁（radial condyle）和尺骨髁（ulnar condyle）明显，在后面，两髁之間为一寬而浅的凹陷，此凹陷向上延伸，成为一凹陷区。在橈骨髁的外側尚有一明显的突起。

此骨在一般的特征方面与 *Antrodemus valens* 的較为相似，但是我們的标本比后者长近一倍，并且較为粗壮。近端和远端也較扩展、扁平。三角稜嵴位置較 *Antrodemus valens* 的靠下一些，其下端約在肱骨全长之中間。內蒙古二連 *Alectrosaurus* 的肱骨虽然也很长，但三角稜嵴不如我們这一标本的发育，更重要的是 *Alectrosaurus* 的肱骨骨干不扭轉。

右肱骨（V.2884.1）测量(单位:毫米) [**Measurements of right Humerus** (in mm)]

全　长 (Total length)	580
近端寬 (Proximal width)	210
远端寬 (Distal width)	180
骨干最小直径 (Least diameter of shaft)	78

第 I 指的爪 V.2884.2（图 2）保存完好，爪特别強壮，強烈而有規則地弯曲，非常尖銳且非常側扁，两側各有一明显的側沟，从后端直伸到尖端，近端关节面不高，有一明显的凹陷。

这个爪在其长度、狹窄和异常的側扁等特征上，不同于 *Antrodemus valens* 的爪，而与內蒙古二連 *Alectrosaurus* 的有些相似，但我們的标本仍比其为大，近端的下部分也不如 *Alectrosaurus* 那样粗壮。

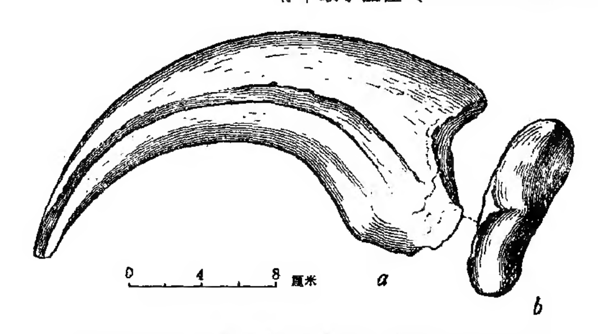


图 2　大水沟吉兰泰龙，新属、新种，V.2884.2
Chilantaisaurus tashuikouensis gen. et sp. nov.
第 I 指的爪 (Ungual phalanx of M. I)
a. 側面观 (lateral view); b. 近端观 (proximal view)。×1/4

爪測量（V.2884.2）（单位：毫米）[**Measurements of Ungual** (in mm)]

最大长度(沿上緣) (Length along upper curve)	260
近端关节面高 (Height of articular facet)	102
近端寬 (Width, proximal)	40

腸骨 V.2884.3（图 3），仅保存有左側的前部分，上緣稍缺，而所能看出的唯一的与 *Antrodemus, Albertosaurus, Tyrannosaurus* 的不同之点是前緣沒有向下弯曲且尖銳的稜。

后肢方面，左右股骨 V.2884.4（图 4）均保存，左側者的远端两髁保存不佳，右側者的股骨头缺失。股骨骨干向前稍弯曲，中等細长。股骨头很明显，稍殘缺。第四轉节为一长而低的嵴，位于骨干上半部的后內側緣，此轉节不如 *Antrodemus valens* 的发育，更不象

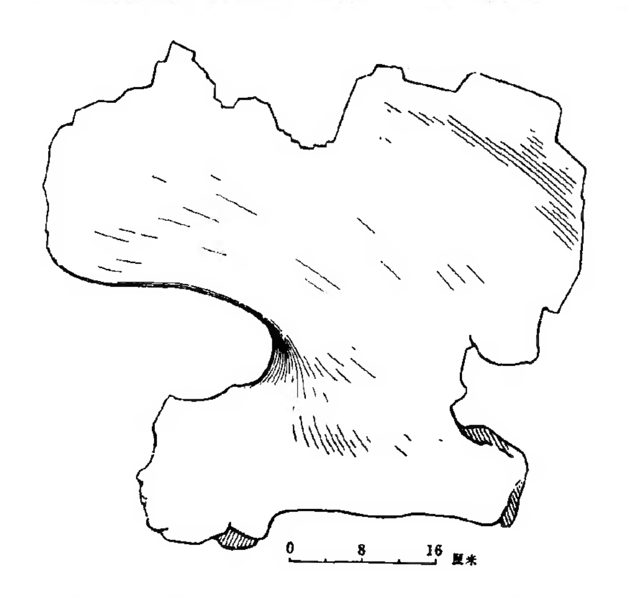


图 3　大水沟吉兰泰龙，新属、新种，V.2884.3
Chilantaisaurus tashuikouensis gen. et sp. nov. 左腸骨前部分 (Anterior part of left ilium)
側面观 (lateral view)。

Tyrannosaurus 的那样接近頂端且很发育。小轉节 (lesser trochanter) 破碎，但是可以看出，在內側与股骨头之間有一寬的間隙。远端两髁发育，为一深的間髁沟所分开，前間髁沟較寬而浅，并且向上延伸。

左股骨 (V.2884.4) 測量(单位:毫米) [**Measurements of left Femur** (in mm)]

全长 (Total length)	1190
头长 (Greatest diameter of head)	265
骨干中部直径 (Mid-diameter of shaft)	150

脛骨 V.2884.5 (图5):右脛骨保存較好，而左側者則很破碎，两端均未保存。脛骨較股骨为短，脛骨和股骨之比为 0.80，与 *Antrodemus valens* 的相近。脛骨的近端和远端均扩展，近端呈三角形，外髁和內髁均破碎，脛骨突 (tibial process) 显著，位于前緣，扁平，向內弯曲，并稍向上突起。 Cnemial process 明显，直接向外突起。远端部分与距骨上升突相連处凹入，呈寬三角形。

右脛骨 (V.2884.5) 測量(单位:毫米) [**Measurements of right Tibia** (in mm)]

全长 (Total length)	954
近端寬 (Width, proximal)	265
远端寬 (Width, distal)	260

腓骨 V.2884.6 (图 6) 仅保存有右側者，其远端部分未保存。近端呈半圓形，骨干細长。

蹠骨 V.2884.7 (图 7):右脚的蹠骨 II、III、IV 和左脚的蹠骨 III、IV 均保存完好。

蹠骨 II 較蹠骨 III 为短，而和蹠骨 IV 大約等长。近端关节面几为梯形，关节面稍平，在后外緣有一凹缺，骨干直。远端关节面是很圓滑的，在前面向上延伸，后面两髁之間有一強壮的凹陷。側窝很明显，內側者大而深。右蹠骨 III 长。近端呈三角形，側扁，最寬处在前面。骨干的背面和后面扁平，中部橫切面呈梯形。前面观，此骨下部分稍向外弯

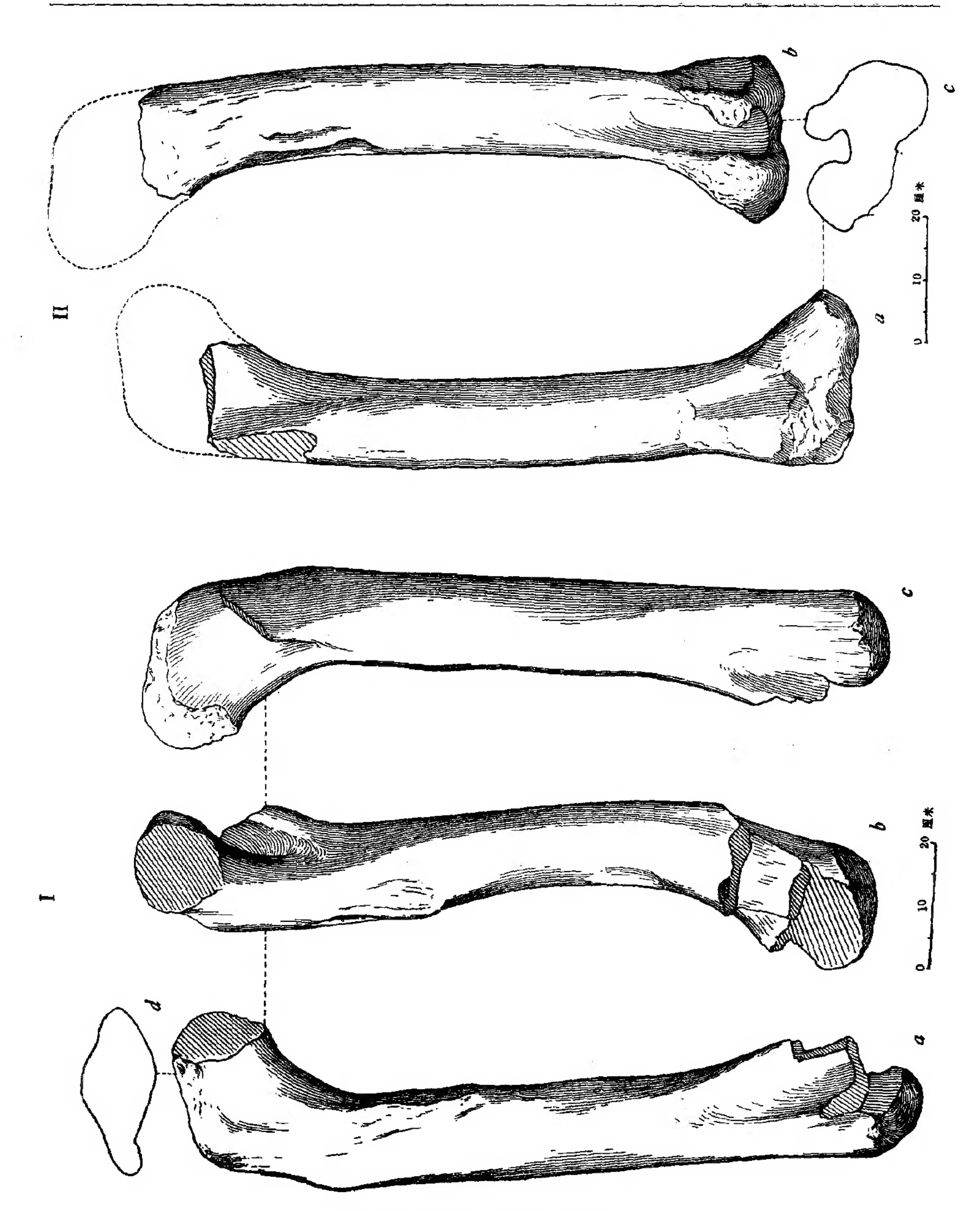


图 4 大水沟吉兰泰龙,新属、新种, V.2884.4

I. *Chilantaisaurus tashuikouensis* gen. et sp. nov. 左股骨 (left femur)

a. 后面观 (posterior view); b. 内面观 (internal view);

c. 前面观 (anterior view); d. 近端观 (proximal view)。

大水沟吉兰泰龙,新属、新种, V.2884.4

II. *Chilantaisaurus tashuikouensis* gen. et sp. nov. 右股骨 (right femur)

a. 前面观 (anterior view); b. 后面观 (posterior view); c. 远端观 (distal view)。

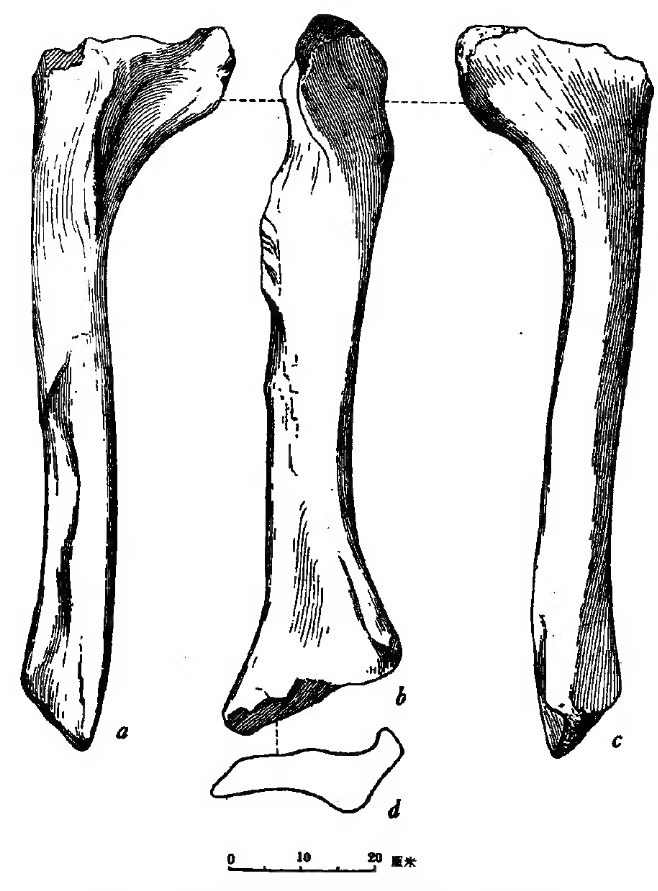


图 5　大水沟吉兰泰龙，新属、新种，V.2884.5
Chilantaisaurus tashuikouensis gen. et sp. nov.
右脛骨 (right tibia)
a. 外側观 (outer side view); b. 前面观 (front view);
c. 內側观 (inner side view); d. 远端观 (distal view)。

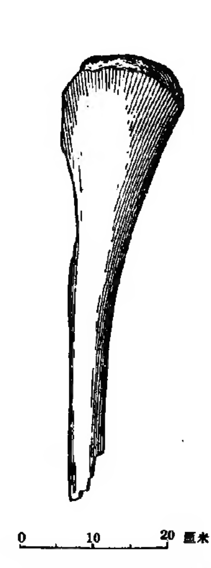


图 6　大水沟吉兰泰龙，新属、新种，V.2884.6
Chilantaisaurus tashuikouensis gen. et sp. nov. 左腓骨 (left fibula)
外側观 (outer side view)。

曲。远端关节面前面很向上。两側窝中等大小，深度中等。右蹠骨 IV，近端呈不規則三角形，前內側面有一凹陷与蹠骨 III 的外突相关节，骨干呈弓状。远端关节面圓而向上，后面为一寬而浅的沟所平分。外緣的側窝消失，內緣的尙明显。

左脚的蹠骨 III、IV 下端部分保存不佳。

所有的蹠骨在許多特征上都与 *Antrodemus valens* 的相似，但比后者为大，而在大小上則与北美早白堊世 *Acrocanthosaurus* 的相近。但是从与脛骨和与股骨的比例上来說，則与所有已知种的都不相同，比数都較小，說明我們标本的蹠骨是比較短的。蹠骨 III 与脛骨之比为 0.47，蹠骨 II 与脛骨之比为 0.419，与股骨之比为 0.33。

比較:

內蒙古阿拉善旗的标本由于肱骨长而粗壮，骨干稍扭轉，脛骨比股骨短，蹠骨頗短，骨干不退化等特征，似应屬于巨齿龙科 (Megalosauridae)，而不可能屬于霸王龙科 (Tyrannosauridae)，但是与巨齿龙科中和霸王龙科中的已知屬之間有下列明显的区别。

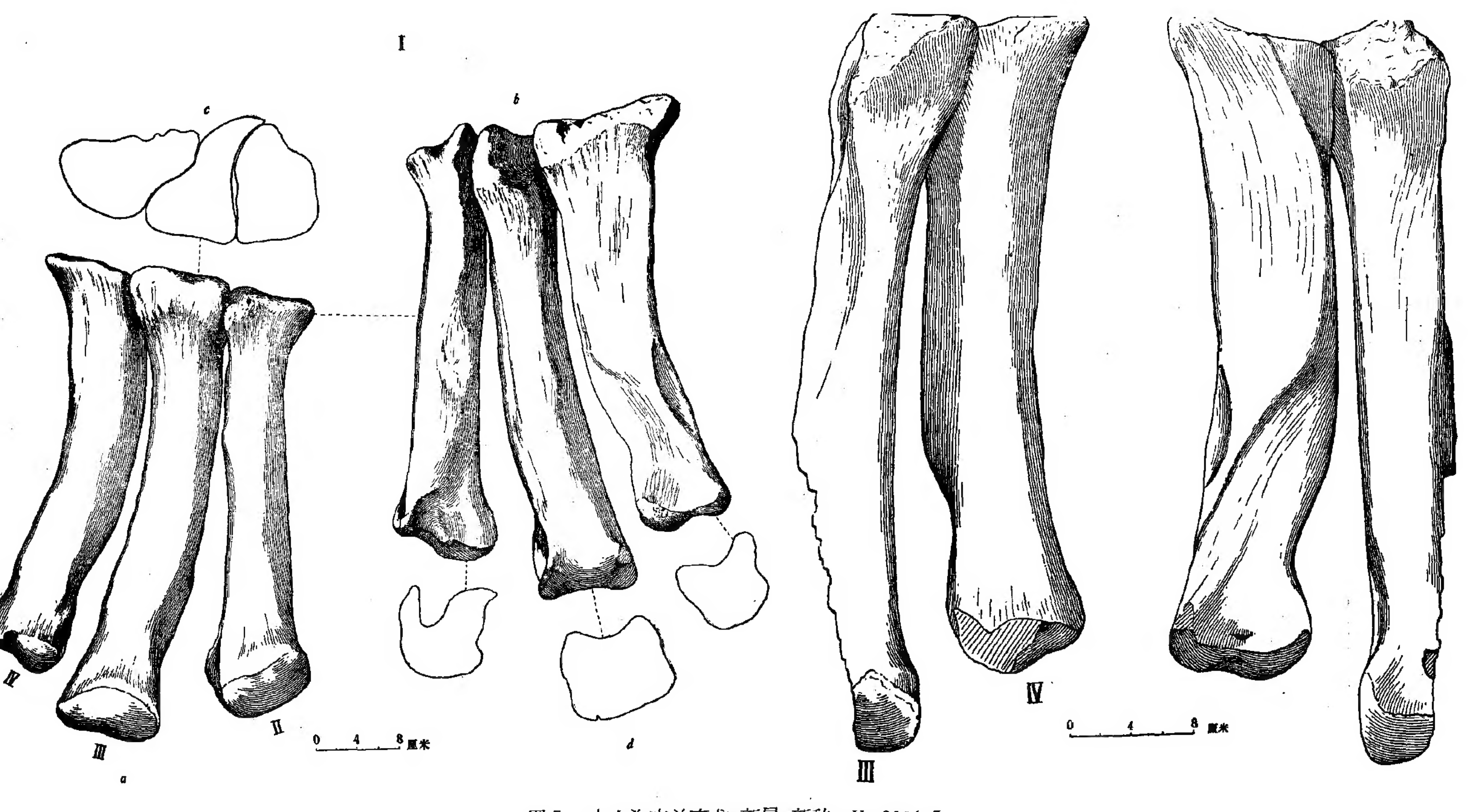


图 7　大水沟吉兰泰龙，新属、新种，V. 2884.7

I. *Chilantaisaurus tashuikouensis* gen. et sp. nov. 右蹠骨（II, III, IV, right metatarsals II, III, IV.）

a. 前面观（anterior view）; b. 后面观（posterior view）; c. 近端观（proximal view）; d. 远端观（distal view）。

大水沟吉兰泰龙，新属、新种，V.2884.7

II. *Chilantaisaurus tashuikouensis* gen. et sp. nov. 左蹠骨 III, IV.（left metatarsals III, IV.）

a. 前面观（anterior view）; b.后面观（posterior view）。

蹠骨（V.2884.7）測量(单位:毫米) [**Measurements of Metatarsals** (in mm)]

	II		III		IV	
	右 Right	左 Left	右 Right	左 Left	右 Right	左 Left
全　长 Total length	400		450	470	395	410
近端寬 Width, proximal	80		90		120	90
远端寬 Width, distal	86		100		85	80

1. 肱骨很长且粗壮。与股骨之比为 0.487，几乎为股骨长度的一半，而 *Antrodemus valens* 为 0.364，*Albertosaurus* 为 0.297，*Tarbosaurus* 則更短，股骨与肱骨之比为 4:1。与內蒙古二連晚白堊世的 *Alectrosaurus olsoni* 相比，虽然后者的肱骨也很細长，但肱骨扩大的两端間的骨干是在同一平面上，而沒有明显的骨干扭轉。

2. 前肢第 I 指的爪特别強壮，大而窄扁，为現在已知种中最大的一种，而近端关节面則并不高。这一特征与 *Alectrosaurus* 的相似，但后者近端下部較粗壮。

3. 股骨第四轉节比 *Antrodemus valens* 的弱。股骨比脛骨长。脛骨与股骨之比为 0.80，与 *Antrodemus* 的相近，*Tyrannosaurus* 为 0.90，*Albertosaurus* 为 0.96，*Alectrosaurus* 和 *Tarbosaurus* 脛骨与股骨等长。这說明我們标本的脛骨在已知种中是最短的一种。

4. 蹠骨頗短，粗壮，在巨齿龙科中和霸王龙科中所已知的几个种，蹠骨 III 都較肱骨为长，而我們的标本則相反，要比肱骨短得多。从与股骨、脛骨相比，其比率比 *Antrodemus valens*、*Albertosaurus* 要小，說明內蒙古阿拉善旗标本的蹠骨很短。同时三个蹠骨均很发育，而不象二連的 *Alectrosaurus* 的蹠骨 III 上部分退化，两側的蹠骨向中間挤得很紧。

在上述的特征中，諸如肱骨长而粗壮，骨干稍扭轉；脛骨比股骨短；蹠骨頗短和第III蹠骨近端不退化，都表明內蒙古阿拉善旗的标本尙具有一定的不很特化的性質，而且与巨齿龙科中所已知的属种有很明显的不同，因而可代表一新的属种，訂名为大水沟吉兰泰龙 *Chilantaisaurus tashuikouensis*。

至于該属种的时代問題，由其所具有的特性來看，比北美晚侏罗世至早白堊世的 *Antrodemus valens* 和北美早白堊世的 *Acrocanthosaurus* 要晚，但由于其尙具有一定的不很特化的性質，因此在时代上似乎不可能晚很多，很可能为晚白堊世的早期。

此外，在大水沟与上述材料一起发現的还有一个单个牙齿和两个尾椎，根据他們的特征，应归属于肉食龙类，并且极可能是归于大水沟吉兰泰龙这一种。

牙齿（V.2884.8）侧扁，前后緣都具有明显的鋸齿，后緣的鋸齿一直延伸至基部，而在前緣仅上部分有鋸齿，下部分因标本破碎而未保存，但由于由尖端向下鋸齿逐渐減弱，推測在近基部时可能完全消失。前后緣寬 20 毫米，两側面最大直径为 11 毫米，保存长度为 45 毫米（图 8）。

尾椎：中部尾椎的前部分，椎体高与寬几相等，高 130 毫米，寬 135 毫米，椎体后部未保存。后中部尾椎的神經棘未保存，椎体腹面有一明显的縱沟，椎体双凹型。

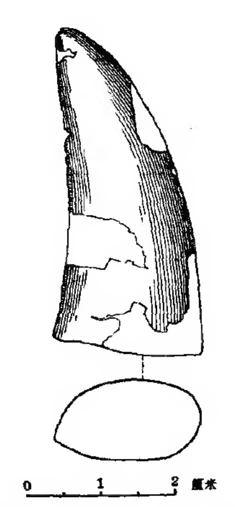


图 8 大水沟吉兰泰龙，新属、新种，V.2884.8
Chilantaisaurus tashuikouensis gen. et sp. nov.
牙齿 (tooth)。

毛尔图吉兰泰龙 *Chilantaisaurus maortuensis* 新种

特征：头骨小，枕髁大，枕骨大孔小，上顎骨上有 12 个牙齿，牙齿前后緣都具有細小的鋸齿，方骨小。

材料：包括一头骨的后部分，一完整的右上顎骨和一破碎的左上顎骨，一樞椎，六个尾椎。标本登記号 V.2885。

产地和时代：內蒙古巴彥淖尔盟，阿拉善旗吉兰泰盐湖北 60 公里毛尔图鄂博。早白堊世。

描述：

头骨 V.2885.1 (图版 I)仅保存有后部分及上顎骨。枕髁大，关节面圓滑。基枕骨的中上部分形成枕骨大孔(magnum foramen)的下緣。基枕骨突的側緣与外枕骨相連接。外枕骨 (exoccipital) 从基枕骨后外緣伸出，形成寬的似翼的板，此骨应与副枕骨 (paraoccipital) 相連接，但由于标本破碎，不能分辨出他們的交界处。外枕骨在枕骨大孔上緣相遇，形成枕骨大孔的上緣。副枕骨向后向外伸出，但保存不完整。在基枕骨和外枕骨之間有一深的縱长的凹陷，其上部有 IX、XI 和 XII 对脑神經孔。上枕骨 (supraoccipital) 为一縱长而較发育的骨板，上部与頂骨相連，側面与外枕骨的向上突出部分相連，其下部則与外枕骨的上部相連接。上枕骨中部有一明显的縱嵴。翼蝶骨 (alisphenoid) 比較大，分为上枝和下枝，上枝与頂骨相連，下枝与前耳骨相連，在上下枝交合处有一神經孔(三叉神經)。內面与眶蝶骨相連，翼蝶骨和眶蝶骨之間有第 III 和第 IV 对脑神經孔。基蝶骨 (basisphenoid) 位于基枕骨突的腹側，但在我們的标本中，因破碎而保存不全。眶蝶骨 (orbitosphenoid) 保存不好，但仍可看出其位于翼骨之間。在眶蝶骨的下后部有一很大的孔，为第 II 脑神經的开口。頂骨 (parietal) 从枕部观，为垂直而横向扩展的骨，与上枕骨一起形成整个的枕区的上部。前耳骨 (prootic) 位于頂骨和枕骨之間，其上部有一卵圓孔 (oval foramen)。

額骨 V.2885.2 (frontal 图版 II)后部稍缺，整个額骨短而寬，中部有一明显的縱嵴，前側緣有一近直角的凹缺而为与前額骨相連，前端以齿状縫綫与鼻骨相連接。最大寬度为 135 毫米。

方骨 V.2885.3 (quadrate)(图 9) 左右者均保存較好，仅左側者頂端稍殘缺。方骨短小，背腹面最大长度为 150 毫米，近端有一长圓形的关节面与鱗骨关接，远端很扩展，具有光滑的关节面，远端的外緣处有一块凸凹不平的面。方骨內側面的下部有一深的凹陷，在凹陷的上前方伸出一薄的三角形的骨片。远端的最大寬度为 72 毫米，近端最大直径为21 毫米。

上顎骨 V.2885.4 (maxilla) (图 10)右側者保存完好，左側者仅保存中段。在右上顎骨上有12个牙孔，保存有刚出露的第八个牙齿，其余的牙齿均失去。从保存的牙齿来看，牙齿側扁，向后弯曲，前后緣均具有鋸齿，鋸齿較細小，每 5 毫米有 12 个鋸齿。从側面观，上顎骨呈不規則三角形，前端高而后端較低，突起的基部形成第二眼前孔，但其后緣未保存。从外側面观，下緣是稍为弯曲的，在外緣表面上有两列較大的孔，这两列孔几乎是平

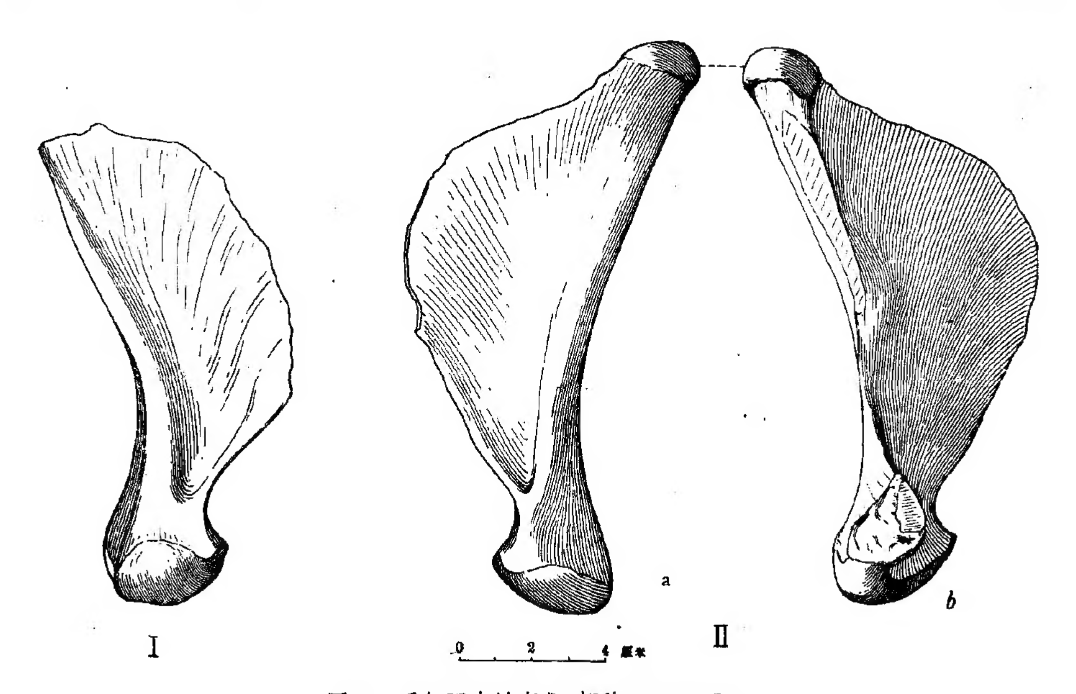


图 9　毛尔图吉兰泰龙，新种，V. 2885.3
I. *Chilantaisaurus maortuensis* sp. nov. 左方骨 (left quadrate) 內面观 (inner view)。
毛尔图吉兰泰龙，新种
II. *Chilantaisaurus maortuensis* sp. nov. 右方骨 (right quadrate)
a. 內面观 (inner view); b. 外面观 (outer view)。

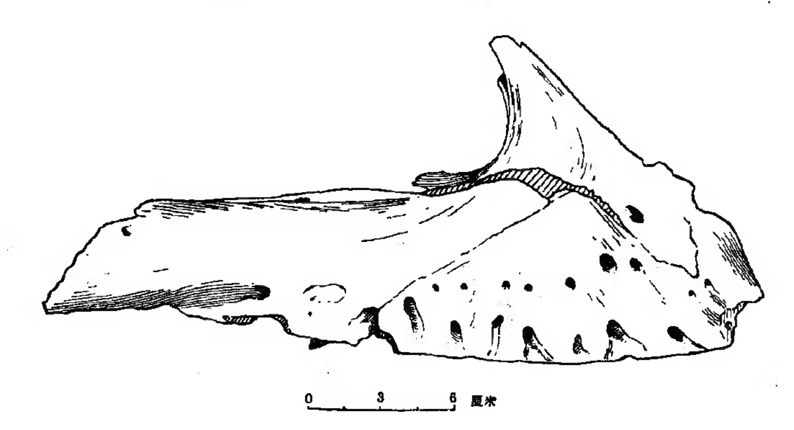


图 10　毛尔图吉兰泰龙，新种，V.2885.4
Chilantaisaurus maortuensis sp. nov. 右上顎骨 (right maxilla) 外面观 (outer view)。

行的，而下列又平行于上顎骨的下緣，近上顎骨前端，在两列孔之間仅有两个小孔，而不象 *Antrodemus valens* 的那样有許多小孔。齿孔从前往后逐渐变小。上顎骨最大长度为 293 毫米，齿孔列的最大长度为 267 毫米。

脊椎一共有七个，其中包括一个枢椎、三个前部尾椎和三个中部尾椎。

枢椎 V.2885.5 (图 11)，椎体前部分稍缺失，椎体腹面圓滑无稜嵴，側面中部压縮，具有一长圓形的孔，位于椎体側面中央。神經弧低，神經棘发育。后关节突大、面向下，超出

椎体后端。两后关节突下緣各有一小的凹陷;在两后关节突之間、神經孔之上有一深的凹缺。前关节突非常不发育。横突不发育,其后緣有一小的凹陷。脊椎高 151 毫米,后端最大寬度为 34 毫米。

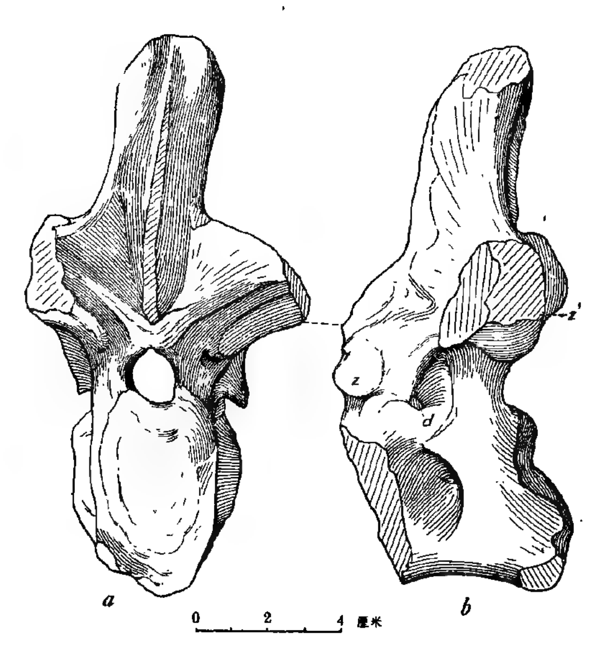


图 11 毛尔图吉兰泰龙,新种, V.2885.5
Chilantaisaurus maortuensis sp. nov. 枢椎 (axis)
a. 后面观 (posterior view); b. 左側观 (left side view)。×1/2
d. 横突 (diapophysis); z. 前关节突 (anterior zygapophysis);
z'. 后关节突 (posterior zygapophysis)。

整个枢椎与 *Antrodemus* 的相比較,我們的标本椎体小,椎体側面的孔位置居中;神經棘不是非常向后傾斜;横突不甚发育。

三个前部尾椎 V.2885.6 的神經棘均未保存,有一个尾椎的前关节突保存完好(图 12a)。椎体双凹型,椎体側面上端有小孔,椎体下端的脉弧关节面很显著,腹面圓滑无縱

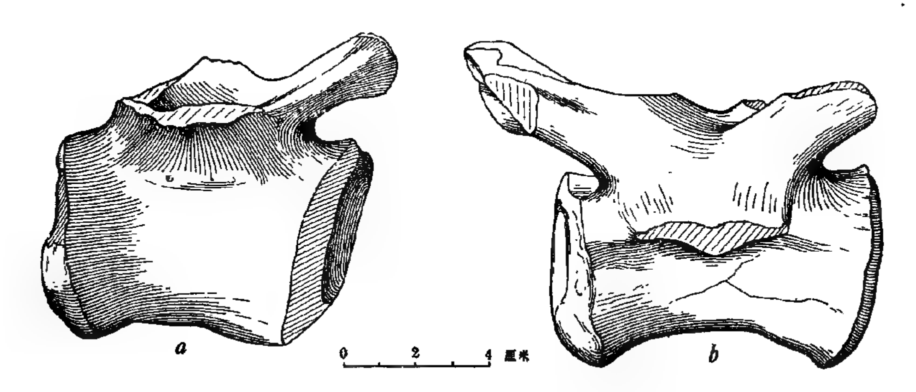


图 12 毛尔图吉兰泰龙 *Chilantaisaurus maortuensis* sp. nov. 尾椎 (caudal)
a. 前部尾椎 V.2885.6 右側观 (anterior caudal vertebra right side view);
b. 中部尾椎 V.2885.7 右側观 (middle caudal vertebra right side view)。

沟。前关节突的关节面向内。三个中部尾椎 V.2885.7 只有一个保存較完整(图 12),其余两个仅保存椎体部分。椎体双凹型,腹面有纵沟,横突較发育,神經棘向后上伸出,前关节突向前伸出,但不超出椎体前端,关节面向内。后关节突位于神經棘两侧下緣,关节面向外。另外的两个尾椎仅保存椎体,横突已經減退。

前部尾椎測量 (V.2885.6) (单位:毫米)
Measurements of anterior caudal vertebrae (in mm)

	1	2	3
椎体长(由侧面量) Length of centrum, measured from lateral side	65	69	71
椎体前寬 Breadth of anterior part of centrum	53	47	52
椎体前高 Height of anterior part of centrum	60	56	58

中部尾椎測量 (V.2885.7) (单位:毫米)
Measurements of middle caudal vertebrae (in mm)

	1	2	3
椎体长(由侧面量) Length of centrum, measured from lateral side	86	84	89
椎体前寬 Breadth of anterior part of centrum	45	49	
椎体前高 Height of anterior part of centrum	53	48	

比較:

从标本所显示出来的特征:头骨小,上枕骨狭窄、长方形,方骨短,并且活动地与鱗骨相关接等,应該是属于巨齿龙科(Megalosauridae),但与該科中所已知的属种尚有不同。从标本所保存的部分与北美的 *Antrodemus valens* 相比,是較相似的,但我們的标本枕髁大,枕骨大孔小,額骨較寬而短,方骨短小,上顎骨只有 12 个牙齿孔,鋸齿較細小等,可与后者显著地区别。与北美早白堊世的 *Acrocanthosaurus* 相比較,在額骨方面,我們的标本則更为短寬。由毛尔图标本的牙齿和脊椎的結构来看,除了脊椎的大小不同之外,他們是比較相似于大水沟的材料,因此,毛尔图的标本可考虑属于吉兰泰龙。但是毛尔图的大多数材料是不能与大水沟的相比較,因为他們各自由不同部位的骨骼所代表;另外在层位方面,由于毛尔图标本的层位較大水沟的为低,因此,不宜归为同一种,似可作为一新种,并以其产地——毛尔图命名为 *Chilantaisaurus maortuensis*。

关于此新种的时代,由于他們較相似于北美的 *Antrodemus valens*,但在我們标本的上顎骨牙齿数目方面所显示出的較特化的特征,因此在时代上可能稍晚于 *Antrodemus valens*,而为早白堊世。

毛尔图不能鉴定的单个牙齿:

Theropoda indet.:一共有六个单个牙齿,它們无疑地是属于肉食龙类的。

1. 五个单个的牙齿，其中两个破碎。牙齿侧扁，向后弯曲，前緣鋸齿非常小，至尖端已无鋸齿，而后緣鋸齿则很明显。鋸齿細小，每 5 毫米有 16 个鋸齿。牙齿横切面呈椭圆形（图 13）。

从这五个牙齿的一般特征和形状看来，与四川龙（*Szechuanosaurus*）的牙齿較近似。但四川龙的前緣有明显的鋸齿与我們的标本不同。由于标本少，而保存不完整，不能作进一步的鉴定。

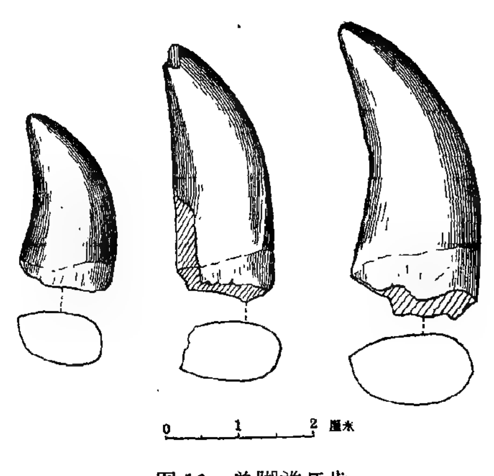


图 13 兽脚类牙齿
(teeth of Theropoda indet.)

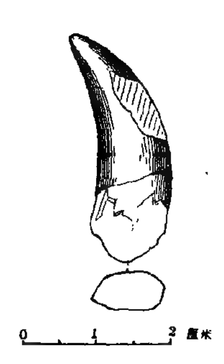


图 14 兽脚类牙齿
(tooth of Theropoda indet.)

牙齿測量(单位:毫米) **Measurements of Teeth** (in mm)

	近基部前后緣寬 The Anterior Posterior Breadth near the Base	两側最大直径 Transversal Max. Diameter	保存长度 Preserved Length
1	17	10	40
2		8	35
3	12	7	25

2. 一个較細长的牙齿（图 14），牙齿側扁，前后緣均具有很明显的鋸齿，与上述五个牙齿的主要区别，除鋸齿外，牙齿更为側扁而細长，基部寬 10 毫米，两側面最大直径为 5 毫米，保存长为 26 毫米，可与四川龙的 V.239 号标本相比，但后者似較寬，并且不如前者側扁。从这些区别看来，有可能与前述的五个牙齿不是属于同一种的。

小 結

中国現知的肉食龙类共九属十种，其中一属一种为晚三迭世的，二属二种为晚侏罗世的，其余的属种均为白垩紀的。关于他們在地史地理上的分布可列表如下：

	化石 Fossils	产地 Localities
晚白垩世 Late Cretaceous	*Alectrosaurus olsoni* *Albertosaurus periculous* *Chinkankousaurus fragilis* *Szechuanosaurus* cf. *campi* Cf. *Szechuanosaurus campi* *Chilantaisaurus tashuikouensis* gen. et sp. nov.	内蒙古二連 黑龙江白崖 山东莱阳 山东莱阳 新疆吐鲁番 内蒙古阿拉善旗吉兰泰
早白垩世 Early Cretaceous	*Chilantaisaurus maortuensis* gen. et sp. nov. ?*Prodinodon* sp. Megalosauridae indet.	内蒙古阿拉善旗吉兰泰 内蒙古 Tebch 山西左云
晚侏罗世 Late Jurassic	*Szechuanosaurus campi* *Chienkosaurus certosauroides* Megalosauridae indet.	四川广元 四川广元 辽宁阜新，江西泰和
晚三迭世 Late Triassic	*Sinosaurus triassicus*	云南禄丰

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CARNOSAURIAN REMAINS FROM ALASHAN, INNER MONGOLIA

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(Summary)

In China remains of Carnosauria are of wide distribution, geographically and stratigraphically. They belong to *Sinosaurus* of Yunnan, *Szechuanosaurus* and *Chienkosaurus* of Szechuan, *Chinkankousaurus* of Shantung, *Alectrosaurus* and ?*Prodinodon* of Inner Mongolian Autonomous Region, and *Albertosaurus* of Heilungchiang. Besides, many isolated teeth and fragmental bones of uncertain generic affinity have also been discovered in Sinkiang, Kansu, Liaoning, Shansi and Kiangsi.

In 1960, a collection of fossils of Carnosauria were collected by a group of Chinese and Soviet paleontologists at Maortu and Tashuikou, about 60 km. north of Chilantai, on the east side of Chilantai Salt Lake in eastern part of the great Alashan deserts, Inner Mongolian. The specimens are well preserved, and found in association with those of Ornithopoda, Sauropoda, Ankylosauria and turtles; besides, fossils of plants and invertebrates were also found. The present paper is a description of the Carnosaurian materials from Maortu and Tashuikou.

DESCRIPTION OF THE SPECIMENS

Order Saurischia

Suborder Theropoda

Infraorder Carnosauria

Family Megalosauridae

Genus *Chilantaisaurus* gen. nov.

Diagnosis: Humerus massive and elongate. Ungual strongly curved. Fourth trochanter of femur less developed. Tibia shorter than femur. Three metatarsals, short and not compactly united.

Chilantaisaurus tashuikouensis sp. nov.

Material: A right humerus, an ungual of M.I, a fragmentary ilium, a right and a left femur, a right and a left tibia, a right fibula, right metatarsals II, III, IV and left metatarsals III, IV. Cat. no. of IVPP V.2884.

Horizon and Locality: Late Cretaceous. Tashuikou, 60 km. north of Chilantai, Alanshan, Inner Mongolian Autonomous Region.

Diagnosis: As for the genus.

Description:

Fore limb: The right humerus and an ungual are well preserved. Humerus V.2884.1 (fig. 1) is long, stout, and somewhat sigmoid in form. The proximal end expanded, and the head is situated about the middle of the proximal end. The deltoid

crest strongly developed, forming a short but high and curved bony plate, which situates on the anterior-external border immediately about 150 mm below the proximal end, and this crest is rise suddenly. Below this crest the shaft of the bone is stout and relatively round in cross section. The distal end is also expanded. The radial and ulnar condyles are well defined. A process is very prominent on the outer side of the radial condyle. Posteriorly, the both condyles are separated by a depression which unusually broad but shallow, and continues somewhat upward by on the shaft of the bone.

This bone, in many features, resembles the humerus of *Antrodemus valens* of N. America, but it is much more stouter than latter one, and almost twice as long as that of latter one. The lower end of deltoid crest is just situated on the middle part of the bone, and it is much expanded, proximally and distally, than the corresponded bone of *Antrodemus valens*. The humerus of *Alectrosaurus* is also much longer, but without decided twist.

Ungual of digit I is well preserved V.2884.2 (fig. 2). It is especially stronger and robust, with a regularly and sharply curved and a sharply pointed extremity. On both sides, the well-defined lateral grooves run back from the tip. The proximal articular surface in concave. This ungual differs from those described by Gilmore for *Antrodemus valens* in their length, narrow and very compressed features, etc. It is similar to that of *Alectrosaurus*, but our specimen is larger than that of latter.

Pelvis: The anterior part of the left ilium (V.2884.3) is preserved. There is no recurved point on the anterior and of the blade, it is a different feature from that of *Antrodemus*, *Albertosaurus* and *Tyrannosaurus*. (fig. 3)

Hind limb: The femur of right and left sides are preserved, two condyles of the femur are not well preserved, and the head of the right femur is broken. The right tibia is relatively well preserved and left tibia is very broken. The proximal end of fibula is preserved.

The femur V.2884.4 (fig. 4), with a curved shaft and the arch being forward, is longer than the tibia. It is moderately slight for its size. In middle portion, the shaft is relatively rounded in cross section. The head is clearly defined, but slightly broken. Fourth trochanter is an elongate ridge on the posterior internal side and entirely on the upper half of the shaft, it is less developed. A lesser trochanter is broken, and the basal part of this trochanter is separated from the head by a wide cleft. Two developed condyles of the distal end which being separated by a deep intercondylar groove. Anterior intercondylar groove is relatively narrow and extend up on the anterior surface of the shaft.

Tibia V.2884.5 (fig. 5) is shorter than the femur. The proximal and distal ends of it are expanded. Proximally, the outline is roughly triangular. The outer and inner condyles are broken. Tibial process in very prominent, antero-internal in position, flattened, incurved and slightly upward. The cnemial process prominent, and directed outward. Distally, the anterior face of the tibia slightly concave in its contact with the ascending process of the astragalus and is broadly triangular in outline. The proximal end of the fibula V.2884.6 (fig. 6) is subcrescentic in outline, with the concave side toward the tibia.

Metatarsal V.2884.7 (fig. 7): The metatarsals II, III, IV of right foot and the metatarsals III and IV of left foot are well preserved. Their proximal ends are relatively closely apposed to one another.

The metatarsal II is shorter than metatarsal III, but about equal in length to metatarsal IV, it has a straight shaft. The proximal articular surface is subquadrate in outline, and it is slightly flat, while a notch on the posterior outer margin for the reception of the proximal portion of Mt. I. The distal articular surface is rounded and well up in front. Posteriorly, this end shows a strong excavation between the condyles. The lateral pits of this end are well defined, and the one on the side nearest metatarsal III being the largest and deepest. Metatarsal III is the longest bone, its proximal end is triangular in outline, it is compressed transversally, the widest is on the front. The front of the shaft is flat, and on the back is also flat. In section, at the middle part, this bone is trapezium. In view of the front, the lower part of the shaft slightly swings outward. This rounded articular surface of the distal end extending well up on the front. Two lateral pits are moderate large and depth. The proximal end of metatarsal IV is roughly subtriangular in outline. On the antero-internal side, this proximal end being excavated for the articulation of a outward projection from the head of Mt. III. This shaft is bowed, and the distal articular surface is rounded and well up in front and back. Posteriorly, the face is separated by a wide shallow groove. On the external side, the pit is wanting, while the internal one is defined.

The metatarsals III and IV of the left foot are preserved, but their lower part are not well preserved.

All these metatarsals similar, in many points, to those of *Antrodemus,* but our specimens are larger than those of latter, and similar with those of *Acrocanthosaurus* of N. America in size.

Comparison:

The carnosaur of Tashuikou are characterized by the massive and elongate humerus, the relatively short tibia, rather short metatarsals and the unreduced shafts of the metatarsals, which doubtlessly belong to Megalosauridae. Thus, the specimens are excluded from the Tyrannosauridae. But there are evidently still difference between our specimens and other known genera of Megalosauridae and Tyrannosauridae.

The humerus of our specimen is massive and well elongate, it has a humero-femural ratio of 0.487 much greater than 0.297 of *Albertosaurus,* and 0.364 of *Antrodemus.* The humerus of *Tarbosaurus* of Mongolia is very short, it has a humero-femural ratio of 0.25 and that of *Alectrosaurus* is long and slender, the longest axis of two expanded ends of it lies in the same plane. By these features one can distinguished also these two genera from our specimen.

The tibia of our specimen is relatively short, it has a tibio-femural ratio of 0.80 as that of *Antrodemus,* and much shorter than 0.90 of *Tyrannosaurus,* 0.96 of *Albertosaurus,* and 1 of *Tarbosaurus* of Mongolia. In *Alectrosaurus* the femur is subequal in length to its tibia.

The three metatarsals of our specimen are unreduced and not closely appressed. However, those of *Albertosaurus, Alectrosaurus,* etc., appear to have relatively little motion on one another; and are closely appressed each other and the middle metatarsal may be somewhat reduce proximally.

All the characters of our specimen noted above differ from the other known forms. The writer considers our specimen as a new form, and the name is drived from the locality name Chilantai.

In view of the characters of *Chilantaisaurus tashuikouensis*, the geological age of this form is perhaps slightly later than *Antrodemus* and *Acrocanthosaurus* of N. America, the new form is regarded as probably Late Cretaceous in age.

In association with those specimens described above there are an isolated tooth and two caudal vertebrae. Doubtlessly, according to its features, all belong to Carnosauria, and most probably belong to the same species.

An isolated tooth V.2884.8 (fig. 8), it is laterally compressed, and with a slightly backward curvature. There are distinct serrations on both front and back borders, and the posterior continues to the base of this tooth. The anterior posterior breadth near the base is 22 mm, the transversal maximum diameter is 11 mm, the preserved length of the tooth is 45 mm.

An anterior part of the middle caudal vertebra is preserved, its height and width are subequal, the height is 130 mm, and width is 135 mm. The other one is a posterior middle caudal vertebra, its neural spine is not preserved, the ventral side of the centrum has a definite groove.

***Chilantaisaurus maortuensis* sp. nov.**

Diagnosis: Skull small, occipital condyle comparatively large, maxilla with 12 teeth, quadrate relatively small.

Material: A posterior part of skull, a right maxilla and a fragmental left maxilla, an axis and six caudal vertebrae. Cat. No. of IVPP V.2885.

Horizon and Locality: Early Cretaceous. Maortu, 60 km. north of Chilantai, Alashan, Inner Mongolian Autonomous Region.

Description:

Skull V.2885.1 (Plate I) only the posterior part and maxillaries are preserved. The occipital condyle is large, and the articulating surface is smooth. On the median superior surface, the basioccipital contributes to the inferior boundary of the foramen magnum. The median part and the boundary of basioccipital process are deeply concave, and articulates laterally with the exoccipitals. The exoccipitals from behind extend outward from the basioccipital. They meet on the median line above the foramen magnum. The paraoccipital extends outward, backward, it is not complete. There are deep, vertically elongated depressions between the basioccipital and exoccipital into which foramina for the IX, XI and XII cranial nerves. The supraoccipital is a vertical elongated and relatively developed bone, on the median surface a prominent ridge is developed. Alisphenoid is comparatively large, it consists of an inferior and superior branch, superiorly it unites with the parietal, posteriorly with the prootic. At a point between the upper and lower branch, there is a foramen ovale which trigeminal of fifth nerve. Internally it joins by suture the orbitosphenoid between which are the exits for the III and IV cranial nerves. The basisphenoid extends below the level of the basioccipital. It is not preserved in this specimen. The orbitosphenoid is not well preserved, they lay between of the alisphenoids. A very large opening for the exit of the second nerve immediately below and posterior to this bone. Viewed from occipital, the parietal is vertically and horizontally expanded, in median surface, it unites with the supraoccipital, and forming the entire upper portion of occiput. Prootic is wedged in between the parietal and occipital segments, superiorly it bounds the foramen ovale.

The posterior part of the frontal V.2885.2 (Plate II) is slightly missing, it is comparatively short and great transverse expansion on their posterior half, attaining a combined width of 135 mm. It forms a longitudinal ridge at their median junction. There is a near right angular pit, on anteriorly lateral border, for the reception of the prefrontal. Anteriorly the frontals join the nasals by a tooth transverse suture.

The right and left quadrates are well preserved V.2885.3 (fig. 9), but the tip of the left quadrate is broken. It is relatively short having a greatest length dorso-ventrally of 150 mm, with a rounded articular proximal end for articulation with the squamosal. The distal end is much widely expanded with a smooth articulating surface, there is a rough face on the outer border. On the anterior inner side the quadrate sends anteriorly a thin triangular sheet of bone. The greatest transverse width of the distal end is 72 mm, the greatest diameter of the proximal end is 21 mm.

Maxilla: The right is well preserved, the left is fragmentary. This right maxilla V.2885.4 (fig. 10) contains alveoli for 12 teeth, the functional teeth, with the exception of the eighth freshly erupted tooth from the front, have all been lost. The tooth is laterally compressed, and with a backward curvature. The anterior and posterior edges are minutely serrated, there being about 12 denticulations in a length of 5 mm. Viewed laterally the maxilla is roughly triangular in outline high in front and slender behind. Dorsally it sends upward and backward a heavy tapering process, the base of this process is perforated by the second antiorbital fenestra. Viewed from the outside the dental border is slightly sinuous. There are large number of foramina, which appear to arrange themselves in two rows, between these rows there are only two smaller foramina. The greatest length of the maxilla is 293 mm, and the series of alveoli measure 267 mm in length.

There are seven vertebrae, they include an Axis, three anterior caudal vertebrae and three middle caudal vertebrae.

The anterior part of the centrum of Axis (V.2885.5) is slightly missing (fig. 11). The ventral surface is smooth without keel, and the median lateral sides much pressed, with a elongated opening. The neural arch is low and developed. The anterior zygapophyses are rather weakly developed, and the posterior zygapophyses are very developed. The diapophyses are small. It has a greatest width of posterior extremity of 32 mm, and a greatest height over all of 153 mm. This axis may be distinguished from the homologous element in *Antrodemus* by the vertebral centrum is small, the openings of the lateral sides of the centrum are situated at the median portion; the neural spine do not very incline toward the back; and the diapophyses are little developed.

Three anterior caudal vertebrae V.2885.6 (fig. 12a), their neural spines have all been lost, the anterior zygapophyses are well preserved on one of them. The articular faces of the centra are biconcave. The sides of the centrum are slightly compressed, with a small pit on every side. On both ends the lower articular faces are prominent for the chevron articulation. Three middle caudal vertebrae V.2885.7 (fig. 12b), its centra are amphicoelous.

Comparison:

This skull of Maortu are similar, in some features, to that of *Antrodemus*. It is doubtlessly a member of Megalosauridae. But it differs from all known genera of this family in that its occipital condyle is relatively large, the foramen magnum is small,



毛尔图吉兰泰龙,新种，V. 2885.1

Chilantaisaurus maortuensis sp. nov.

1.头骨后部,后視。×1/2

Posterior part of skull, posterior view. ×1/2

bo. 基枕骨 (basioccipital), eo. 外枕骨 (exoccipital), p. 頂骨 (parietal),
p.oc. 副枕骨突 (paraoccipital process), soc. 上枕骨 (supraoccipital)

2.头骨后部,前視。×1/2

Posterior part of skull, front view. ×1/2

I、II、III、IV、V、VII，表脑神經孔。



毛尔图吉兰泰龙 *Chilantaisaurus maortuensis* sp. nov.
額骨，項視。×1
Frontal, top view. ×1

the maxilla with 12 teeth and the quadrate comparasively small. Its frontal is shorter and wider than that of *Acrocanthosaurus*. In view of the structure of the tooth and vertebrae of Maortu, they are comparatively similar to those of Tashuikou, except the different size. The present specimens are therefore considered as a member of genus *Chilantaisaurus*. But most of Maortu materials can not be compared with those of Tashuikou, because they are represented by different parts of the skeleton; and the geological horizon of Maortu is lower than that of Tashuikou. It seems better to be considered as a distinct species, *C. maortuensis* sp. nov.

The geological age of this new species is most probably early Cretaceous.

Theropoda indet. of Maortu.

From Maortu there are six isolated carnosaurian teeth which can not be determined precisely.

1. Five isolated teeth, two of them are broken. The teeth are laterally compressed, distinct serrations are present on posterior border, and on the anterior border the serrations are much finer, but there are no serration at the tip of the tooth (fig. 13). All these teeth resemable, in general form and feature, to that of *Szechuanosaurus*, but, there is distinct anterior serrations in the Szechuan form.

2. A relatively slender tooth (fig. 14), it is laterally compressed, and with a backward curvature. These distinct serrations are on both anterior and posterior borders. It is resemable to those teeth of *Szechuanosaurus*.